WHAT IS CLAIMED IS:

1. A method of measuring head-media spacing modulation (HMS_Wq), comprising the steps:

determining disk mode frequency for a disk; and

determining HMS_Wq with surface distortion due to disk modes removed.

2. The method of claim 1, wherein the step of determining HMS_Wq includes determining a boundary wavelength.

3. The method of claim 2, wherein the step of determining HMS_Wq further includes: determining a first partial HMS_Wq value in a wavelength region below the boundary wavelength; and determining a second partial HMS_Wq value in a wavelength region above the boundary wavelength.

4. The method of claim 3, wherein the step of determining HMS_Wq further includes combining the first and second partial HMS_Wq values.

5. The method of claim 4, wherein the method of combining includes performing a root-sum-squared combining of the first and second partial HMS_Wq values to produce the HMS_Wq with surface distortion due to disk modes removed.

6. The method of claim 5, wherein the step of determining a first partial HMS_Wq value includes testing the disk at a first rotational speed and the step of determining a second partial HMS_Wq value includes testing the disk at a second rotational speed that is less than the first rotational speed.

7. The method of claim 6, wherein the step of determining a boundary wavelength Λ includes calculating the boundary wavelength Λ in accordance with the equation:

$$\Lambda = \pi \, r \left(\frac{\Omega_1}{60f + n\Omega_1} - \frac{\Omega_2}{60f - n\Omega_2} \right)$$

where r is the radius of a test point on the disk, Ω_1 is the first rotational speed, Ω_2 is the second rotational speed, f is disk mode frequency, and n is the order of the disk mode.

8. The method of claim 7, wherein the steps of determining the first and second partial HMS_Wq values each include: measuring circumferential surface topography of the disk at the radius of the test point; determining the spectrum of the measured circumferential surface topography to generate a surface topography power spectral density; and integrating a product of the surface topography power spectral density and an air bearing transfer function.

9. The method of claim 8, wherein the step of measuring circumferential surface topography includes using at least one of a quadrature phase shift interferometer or a laser doppler vibrometer.

10. An arrangement for topographically characterizing a surface of a hard disk, comprising:

a measurement device that performs time-domain measurement of circumferential surface topography of the disk; and

a processor configured to remove disk modes from the time-domain measurement of the circumferential surface topography.

11. The arrangement of claim 10, wherein the measurement device is configured to perform measurements at different rotation speeds of the disk.

12. The arrangement of claim 11, wherein the processor is further configured to convert the time-domain data to spatial domain data, a disk mode location shifting in a spatial domain topography spectrum between measurements at the different rotation speeds.

13. The arrangement of claim 12, wherein the processor is further configured to determine a first partial head-media spacing modulation (HMS_Wq) over a first wavelength region below a boundary wavelength, and a second partial HMS_Wq over a second wavelength region above the boundary wavelength.

14. The arrangement of claim 13, wherein the processor is configured to determine the first partial HMS_Wq based on measurements made by the measurement device during rotation of the disk at a first rotational speed, and to determine the second partial HMS_Wq based on measurements made by the measurement device during rotation of the disk at a second rotational speed that is lower than the first rotational speed.

15. The arrangement of claim 14, wherein the processor is further configured to combine the first and second partial HMS_Wq values to form a HMS_Wq value for the disk with the disk modes removed.

16. The arrangement of claim 15, wherein the processor is configured to combine the first and second partial HMS_Wq values by a root-sum-squared method.

17. The arrangement of claim 16, wherein the boundary wavelength Λ is determined according to the following equation:

$$\Lambda = \pi \, r \left(\frac{\Omega_1}{60f + n\Omega_1} - \frac{\Omega_2}{60f - n\Omega_2} \right), \text{ where:}$$

r is the radius of a test point of the disk;

Ω_1 is the first rotational speed;

$\Omega_2$is the second rotational speed;

f is disk mode frequency; and

n is the order of the disk mode.

18. The arrangement of claim 17, wherein the measurement device comprises at least one of a quadrature phase shift interferometer or a laser doppler vibrometer.

19. A surface topography characterization arrangement for a disk, comprising:

a surface topography measurement device that produces a topographical characterization of a surface of the disk; and

means for removing disk modes from the topographical characterization.

20. The arrangement of claim 19, wherein the means for removing includes means for determining a boundary wavelength, rotating the disk at a first rotational speed and determining a first partial head-media spacing modulation (HMS_Wq) value for a wavelength region below the boundary wavelength, rotating the disk at a second rotational speed different from the first rotational speed and determining a second partial HMS_Wq value for a wavelength region above the boundary wavelength, and combining the first and second partial HMS_Wq values to form a complete HMS_Wq value for the disk with the disk modes removed.